4250
Performance Verification Manual

Version 2021.2.0

CIRRIS®

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1. Introduction

All Cirris 4250 testers ship with a certificate of calibration that's valid for one year. The calibration can be verified using the instructions in this manual in conjunction with a 4250 Performance Check Kit. The kit includes standards that have been calibrated using instruments with accuracies traceable to the National Institute of Standards and Technology (NIST). The certificate of calibration included with a performance check kit is valid for two years.

No adjustments are made to the tester during the verification process. If the tester fails the verification, it indicates that a hardware problem exists, which requires service. Contact information for help and technical support can be found in the Help / Support section of this manual.

Cirris recommends performing the calibration verification annually at a minimum. However, some organizations may decide to perform the verification more frequently. The performance verification can also be used when troubleshooting testing or product issues to verify that the tester is measuring accurately.

For information on setting up a quality system that meets national quality standards such as ANSI/NCSL Z540-1, and ISO 10012-1, see the appendix of this manual.

1.1 Safety Warning

This symbol on the front of the tester indicates that the Cirris 4250 tester produces high voltage and, therefore, a risk of electrical shock exists. Current and energy are limited to make the testers safer for operators. However, operators should not touch energized test points or the performance check standards during the high voltage verification process.

Individuals using a cardiac pacemaker, an insulin pump, or any electronic controlled medical device should NOT perform high voltage testing or the performance verification process.

For more information on high voltage safety, see the product user manual and visit www.cirris.com/safety.

2. Required Items

- The minimum firmware revision required on the tester is Cirris OS 2019.4.1.28. To check the installed firmware version, from the tester's **Main Menu** > **System Settings** > **About**. Firmware updates are available from the tester page of the Cirris web site.
- The 4250 Performance Check Kit, which includes two calibrated standards:
- The probe that was supplied with the tester.
- A calibrated multimeter capable of measuring DC voltage within the range of .1 to 2.0 volts with an accuracy of ± 1%, such as a Fluke 80 Series meter or equivalent. The input impedance of the meter must be 10 Megohms ± 10%. Bench multimeters, such as Keysight units, typically do not meet this impedance requirement.

  Note: The 42XX Standards Module includes a voltage divider in the verification circuit. Therefore, a high voltage probe is not required to protect the meter during the high voltage portion of the verification process.

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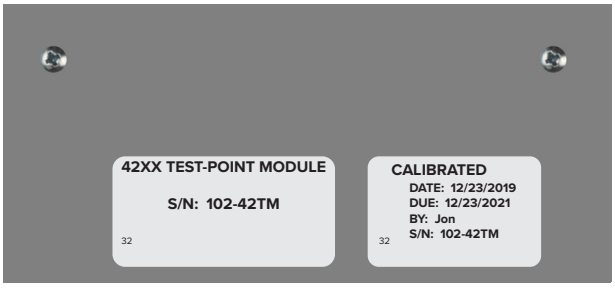
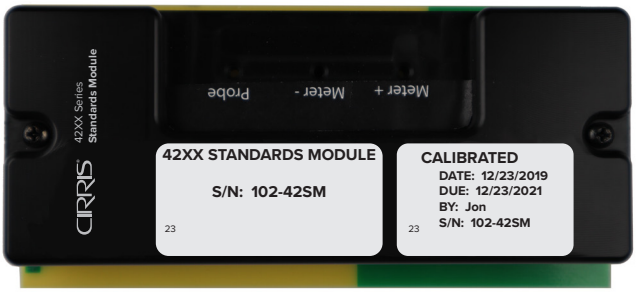
42XX Test-Point Module



42XX Standards Module



Tester Probe

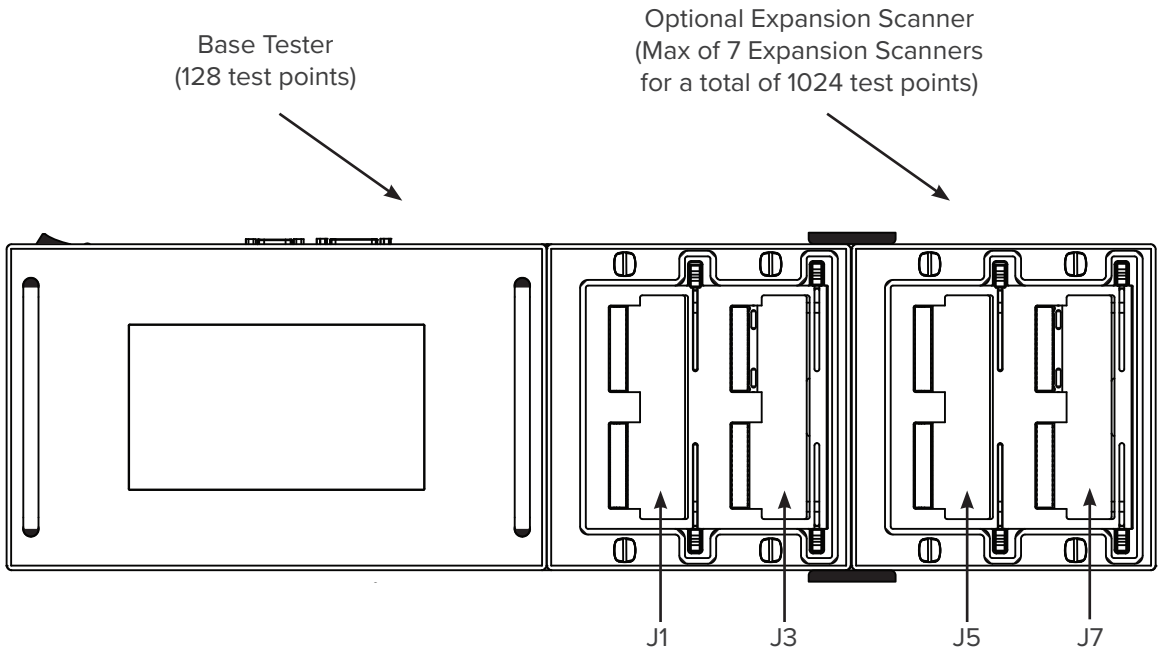
Calibrated Multimeter

3. The Verification Process

3.1 Prepare the Tester

Preparing the tester is a straightforward process

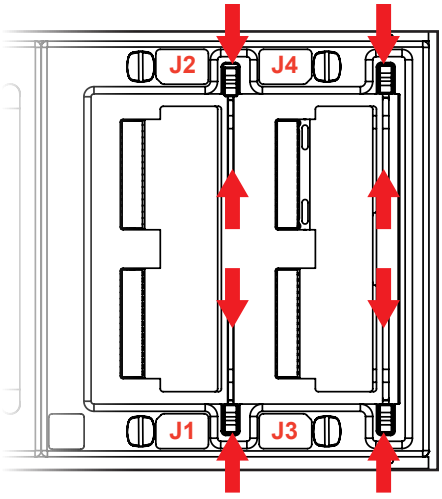
- Connect any expansion scanners that should be included in the performance verification to the tester.
- Remove any test adapters that are installed on the tester or on any of the expansion scanners.
- Plug the tester's probe into the Probe port on the top/rear of the tester.
- Plug the tester's power cord into the power port of the tester and into a grounded power outlet.
- Turn the tester on.



Removing Test Adapters and Installing the Verification Modules

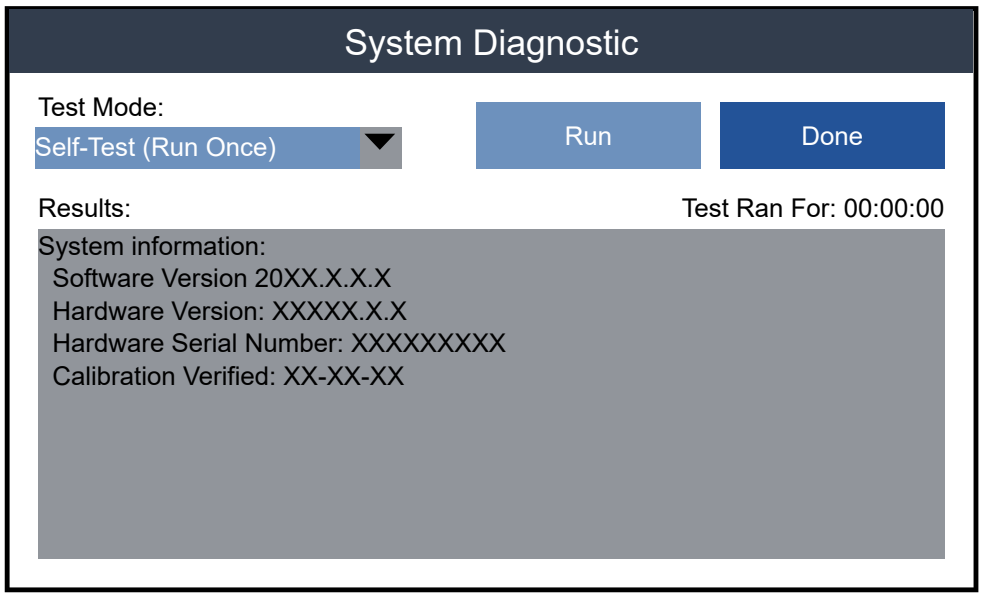
To remove test adapters from the tester, push the slidelocks, marked with red arrows in the graphic, to the outward positions and push the adapter to the right (away from the tester's display) until it disengages from the tester's right angle receptacle(s).

To install the performance verification modules, push the slidelocks to the outward positions and place the module in the instructed location (J1 or J3 on the base tester or J5, J7 etc. on an expansion scanner). Push the module to the left (toward the tester's display) until the right angle pins on the bottom of the module are fully engaged in the tester's receptacles. The slidelocks can be moved to the inward position when the module is fully seated.



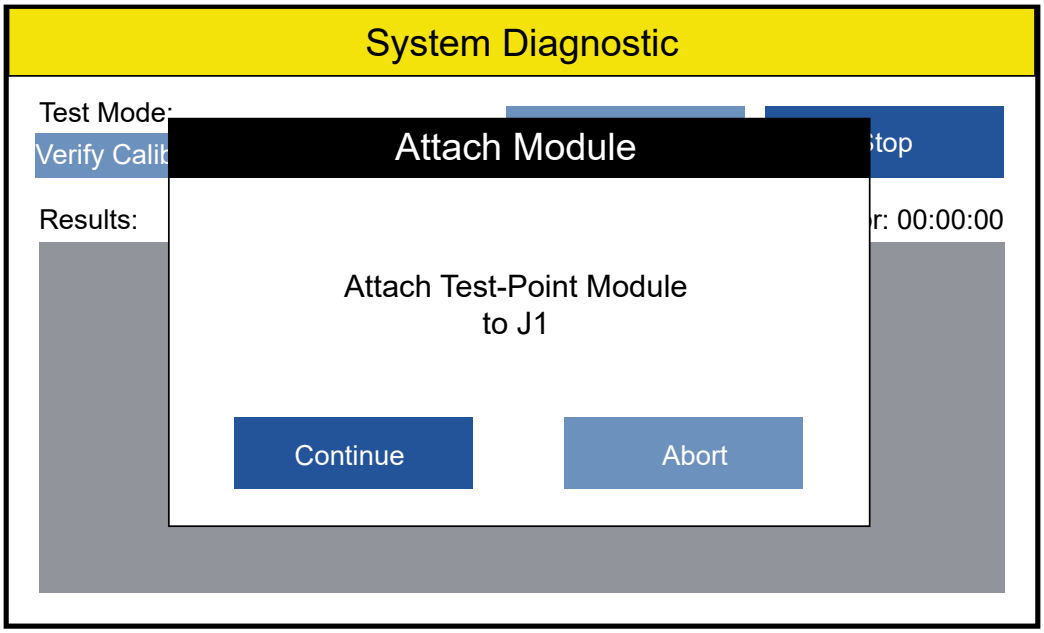
3.2 Initiate the Verification Process

From the Tester's **Main Menu** > **System Settings** > **System Diagnostic**. On the **System Diagnostic** screen select **Verify Calibration** from the **Test Mode** drop-down box, then tap **Run**.

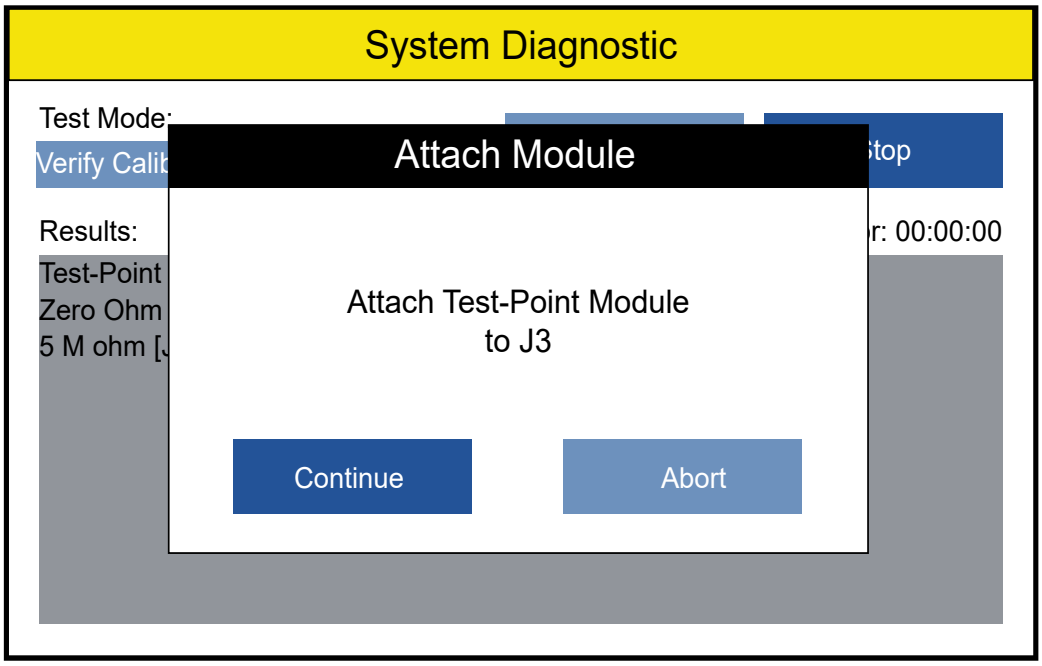


3.3 Test-Point Module

Follow the instructions on the screen and attach the Test-Point Module in position J1, then tap **Continue**.

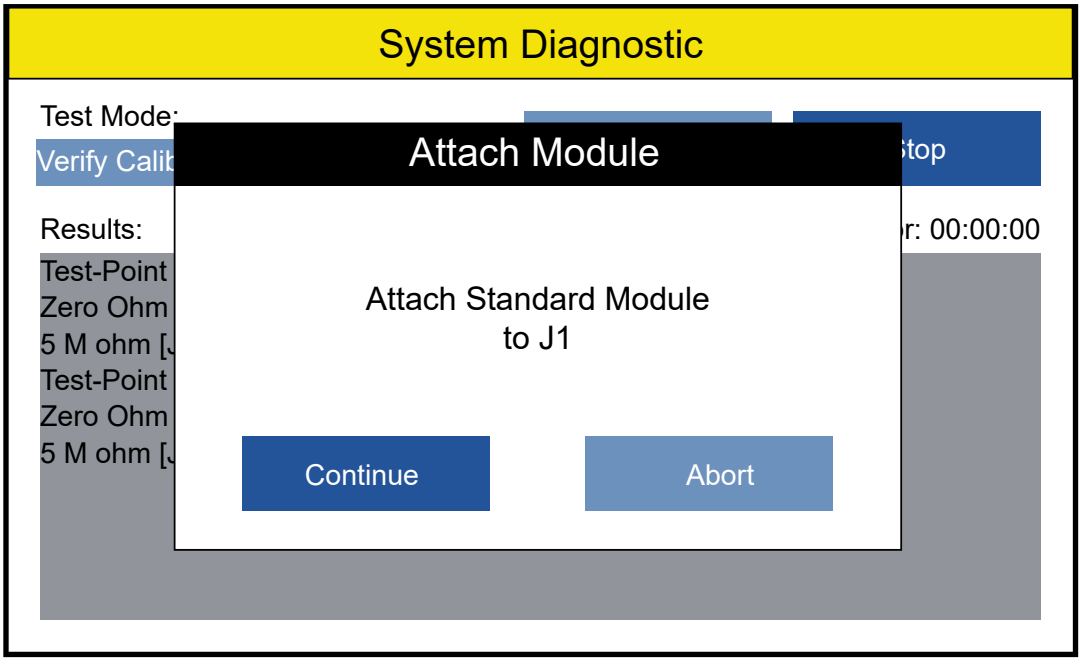


The tester will step through Zero-Ohm and 5 Megohm measurements on each test point. This may take about 30 seconds or more for J1 and each successive “J” position. The tester will emit no sounds during the process. The Zero-Ohm results will be reported to the screen first followed by the 5 M Ohm results. When the process is complete, the tester will display an instruction to attach the Test-Point Module to position J3, the next position on the tester. This process will continue, stepping through all the “J” positions on the base tester and on any attached expansion scanners.

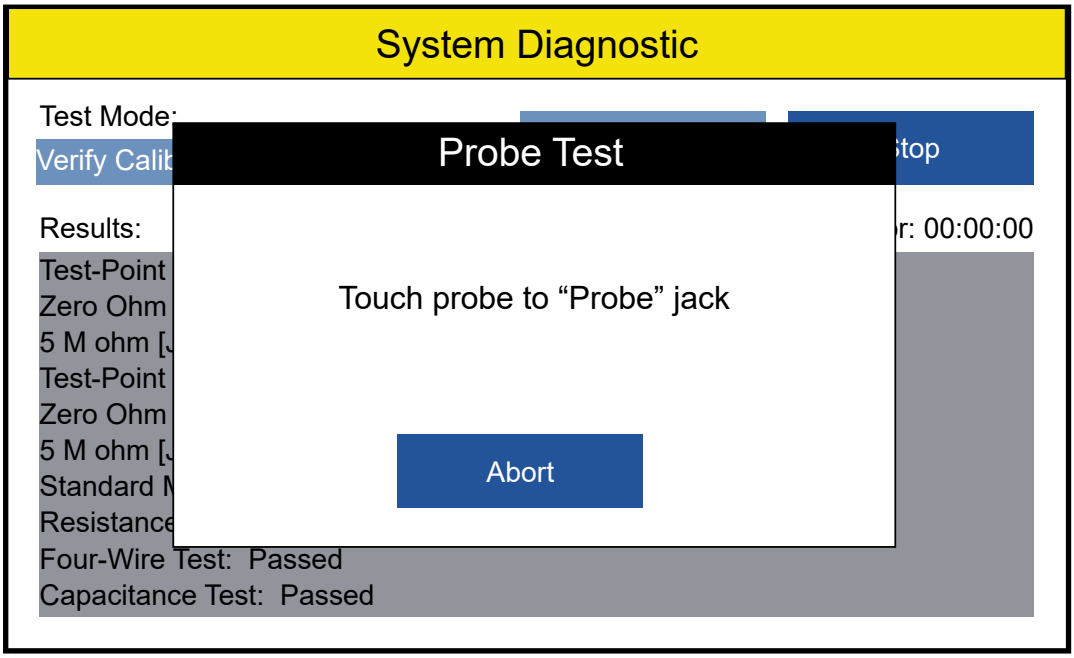


3.4 Standards Module

When all the “J” positions have been tested using the Test-Point Module, the tester will display an instruction to attach the Standards Module to J1. Follow the instruction and tap **Continue**.

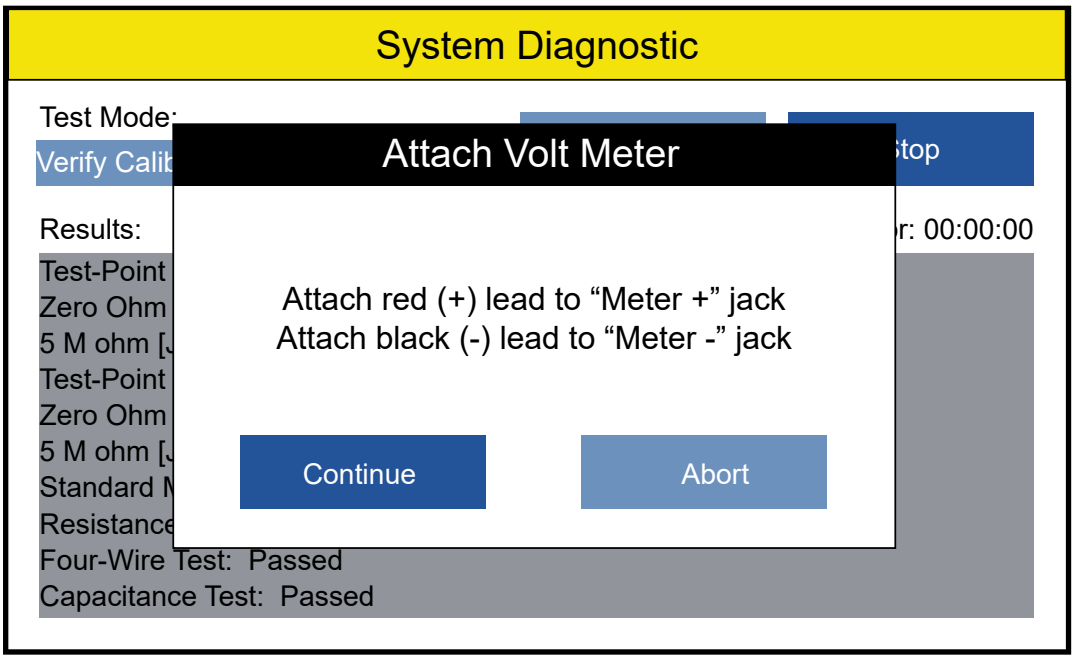


The tester will perform a number of measurements before displaying an instruction to touch the probe to the Probe jack on the Standards Module. Make sure the probe is connected to the Probe jack on the top/rear of the tester. Touching the probe to the Probe jack on the Standards Module will confirm that the probe is working and automatically advance the process to the next step on a pass condition.

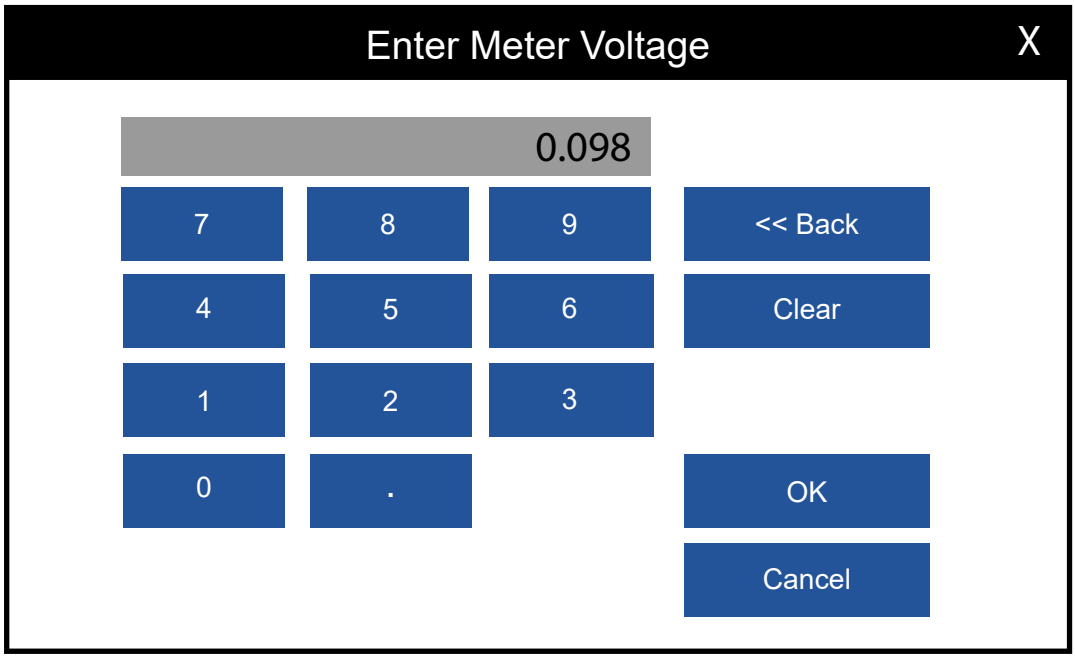


The tester will then display an instruction to attach the red lead of the meter to the **Meter +** jack of the Standards Module and the black lead to the **Meter -** jack. With the meter connected as instructed and ***set to measure DC Voltage***, tap **Continue**.

Note: The tester will be putting out 100VDC, the voltage for the first step in the measurement process, even before the Continue button is tapped.



The tester will output high voltage in 100-volt steps up to the maximum of the tester's range (1500VDC or 2000VDC). At each step, the user will be instructed to enter the measured voltage before tapping OK. Note that the Standards Adapter includes a 1000 to 1 voltage divider that protects the voltmeter from exposure to high voltage. As a result, the voltmeter measurements represent only a fraction of the tester's actual voltage output. For example, 100VDC output by the tester will be measured as approximately 0.1 volts, or 100 millivolts, by the meter. The voltage can be entered in volts as it's displayed on the voltmeter (e.g. 0.098, 0.197, 0.297, 0.397 etc.) or without the decimal point in millivolts (e.g. 98, 197, 297, 397 etc.). Either format is acceptable.

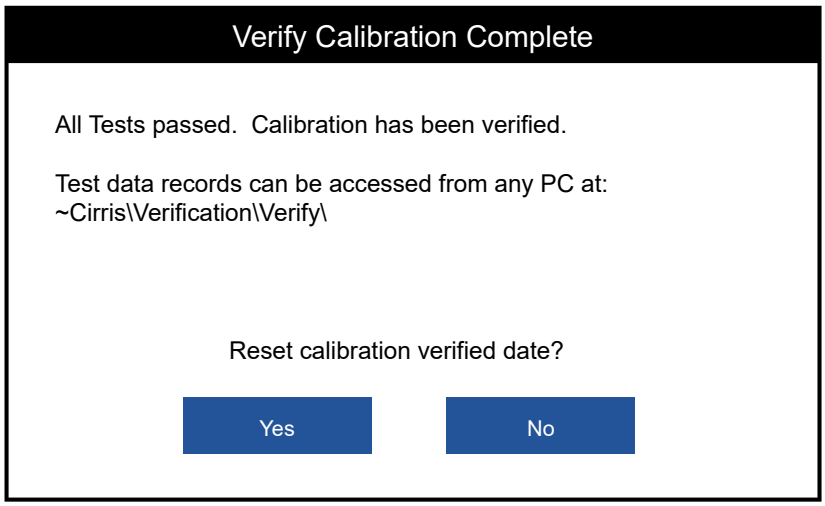


This is the last step of the performance verification process. When the measurements for each voltage step have been entered, the tester will automatically advance to the final result screen.

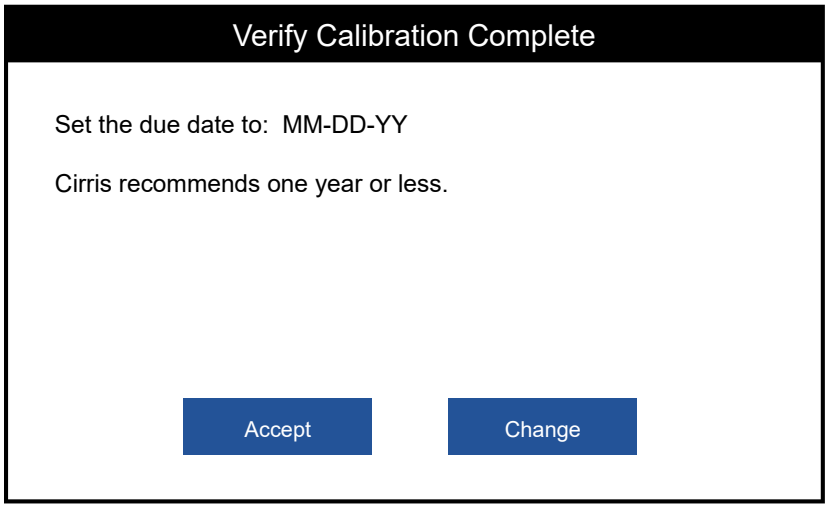
4. Results

4.1 Pass

If the calibration verification passes, the tester will display a message showing that **All Tests Passed. Calibration has been verified**. Tap **Yes** to reset the calibration date or **No** to skip this step and finish the process.



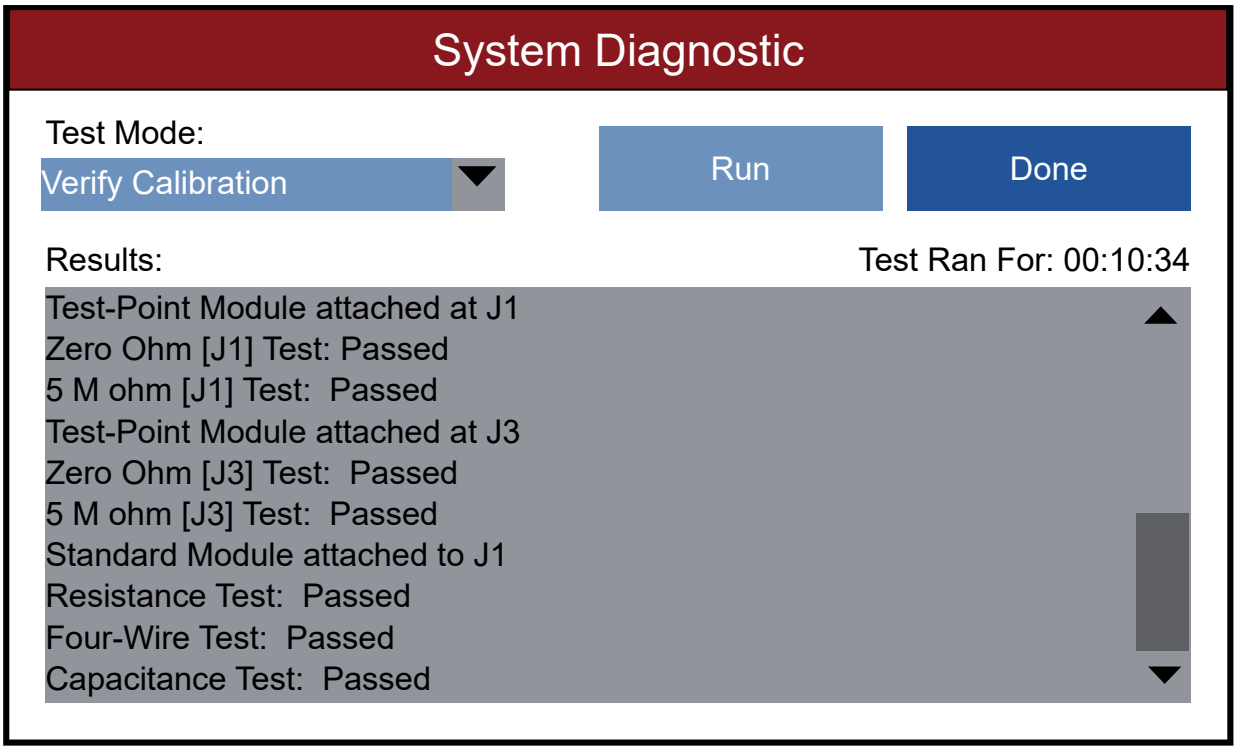
Tapping **Yes** will present a calibration due date one year from the present day's date as one year is the longest verification interval recommended by Cirris. This date can be revised by tapping the **Change** button.



4.2 Fail

If the calibration verification fails, the tester will advance to a screen with a red header indicating a failure. The results will be displayed and the scroll bar can be used to view the complete listing. A failure indicates that the tester and/or expansion scanner(s) require service to address a hardware issue. Contact Cirris Technical Support for information regarding service and repairs.

Contact information for Cirris Technical Support can be found in the Help / Support section on the next page of this manual.



4.3 Results Data

Regardless of whether the calibration verification passes or fails, the results are saved to the tester's internal memory. To access the results data, connect the tester to a PC using a USB cable. With the tester turned off, but still connected to power, the internal memory of the tester will appear in Windows File Explorer as the drive named "4200 SERIES (X)" where "X" is the drive letter assigned by Windows. Under the File Explorer View tab, make sure the Hidden Items box is checked to make hidden folders and files visible. The results will be stored under the path X:\~Cirris\Verification\Verify in two comma-separated values (CSV) files with the filenames ZeroOhm.csv and Verify.csv. The ZeroOhm.csv file includes the results, expected values and measurement data for the Test-Points Module and the Verify.csv file includes the results, expected values and measurement data for the Standards Module.

Note: *The two CSV data files are overwritten each time the performance verification is performed. Therefore, it's recommended that copies of the files be moved to a secure storage location and/or printed, depending on the requirements of the organization.*

A template 4250 Performance Verification Certificate is included the Appendix of this manual. The certificate, or one similar, and a copy of the data files can be used to document the results of the calibration verification.

The data recorded in the ZeroOhm.csv and/or Verify.csv files will also be helpful when discussing the specifics of any failures with Cirris Technical Support.

5. Help / Support

For assistance with any of the topics covered in this manual:

- Email our Technical Support staff at TechSupport@cirris.com
- In the United States, contact our technical support team: 800-441-9910, ext. 666 (or ask for Tech Support)
- Outside the United States, call +1-801-973-4600 or visit www.cirris.com to find the Cirris office nearest to you.
- Visit www.cirris.com/learning-center to read articles on Cirris products and other testing subjects.

6. Appendix

The following information can be used as a guide for setting up a formal quality system in your organization.

Quality Standards
These standards are quality system requirements for organizations that perform quality tests and use calibrated equipment. Establishing a quality system according to the standards ensures that tests are done competently and lends credibility to the organization. In the United States, common quality standards include ANSI/NCSL Z540-1, ISO/IEC Guide 25, ISO 10012-1, and the former MIL-STD 45662A.

You can review the ANSI/NCSL Z540 standard referred to above, as well as other helpful metrology information, from the National Conference of Standards Laboratories International (NCSL) at www.ncsli.org. You can also review the ISO standards from the International Standards Organization (ISO) at their web site www.iso.net.

In the metrology industry, the word “standards” often refers to a centralized, most accurate unit of measurement regulated by countries. The National Institute of Standards and Technology (NIST) maintains the national standards for measurements in the United States.

Good Quality Practices
Quality standards, such as ANSI/NCSL Z540-1 and ISO 10012-1, require several good practices for the calibration industry including the following areas:

Recall System
How do you ensure that your company will remember to send an instrument in for calibration? Use a card file or computerized database recall system. This system includes calibration dates, due dates, calibration sources, and other instrument records. The recall system ensures that instruments are recalibrated in a timely manner.

Verification Labels
How do you know if calibration has been verified without looking for the paperwork? When an instrument’s calibration is verified, the quality standards require the instrument to be labeled as such. These labels, which are applied to instruments, have fields for the instrument serial number, verification date, verification due date, and by whom. A good source of inexpensive labels is United Ad Label at 1-800-992-5755 (www.unitedadlabel.com).

Accuracy Ratios
Can you use a ruler to calibrate your digital calipers? Of course not. Wherever possible, quality standards require an accuracy ratio of at least four to one. In other words, the instrument being used to measure the calibrated instrument should be at least four times as accurate as the calibrated instrument.

Performance Verification Certificate
How do you know that an instrument has been verified? The Performance Verification Certificate is a record of who, when, and by what equipment the instrument was verified. A 4250 Performance Verification Certificate is provided on the next page.

Verification Data Report
How accurate is the calibrated test instrument in relation to its published specifications? Some organizations require the measured values of a calibrated instrument to be written down when that instrument is calibrated. Calibration laboratories typically charge extra to create a data report. However, when an instrument is found to be out-of-tolerance, the quality standards require the out-of-tolerance data be recorded in relation to the instrument specifications. As mentioned previously in this manual, the ZeroOhm.csv and Verify.csv data files should satisfy this requirement,

Traceability
Traceability refers to each unbroken link of valid verifications going back to national standards such as those maintained by the NIST in the United States. To maintain traceability, qualified personnel must perform the performance verification under controlled conditions, using correctly calibrated instruments with correct test accuracy ratios.

4250 Performance Verification Certificate

Name and Address of Organization:	
Certificate Number:	Performed by:
Date:	Due Date:
Applicable Quality Standard(s):	Procedure: 4250 Performance Verification Manual, Version
Temperature:	Relative Humidity:
Tester Serial Number:	

Instrument Used	Serial Number	Cal. Date	Cal. Due Date
42XX Test-Point Module			
42XX Standards Module			
Voltmeter			

Statement of Traceability:

Certified by:

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